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Late Holocene Activity of Kargapazarı Segment, Eastern Part of the North Anatolian Fault Zone, Bingöl, Turkey

T. Sançar (1), C. Zabcı (2), H. S. Akyüz (2), V. Karabacak (3), and E. Altunel (3)

(1) İstanbul Teknik Üniversitesi, Avrasya Yer Bilimleri Enstitüsü, İstanbul, Turkey (sancart@itu.edu.tr, 90 212 2856368), (2) İstanbul Teknik Üniversitesi, Maden Fakültesi, Jeoloji Mühendisliği Bölümü, İstanbul, Turkey, (3) Eskişehir Osmangazi Üniversitesi, Mühendislik Fakültesi, Jeoloji Mühendisliği Bölümü, Eskişehir, Turkey

Kargapazarı segment is located between Kızılcubuk village and Karlıova Triple Junction at the eastern part of the North Anatolian Fault Zone (NAFZ). It elongates with N65-70W orientation and has a length of 25 kilometers. The 17 August 1949 Elmali earthquake (Ms=6.7) and 19 August 1966 Varto earthquake (Ms=6.9) occurred at the western and eastern neighboring faults, respectively. Field observations and witnessing of local people strongly proved that both earthquakes did not create surface rupture on Kargapazarı segment.

This study contains the geomorphological and paleoseismological studies on the Kargapazarı Segment. Fault geometry has been mapped by definition of morphological features. Offset streams between 6-20 m, pressure ridges, fault scarps, hot springs and small travertine formations are clear morphotectonic evidences for fault geometry. A fault related basin, Yoncalık Basin, is delimited by two fault branches at the north and south, around Yoncalık village. Field observations and aerial photo analysis showed that deformation is mainly controlled by the southern branch. At the northern boundary of the basin, morphological indicators are poor for recent activity of faulting.

Paleoseismological trench studies were performed in two locations around the Yoncalık Basin to identify historical earthquakes. The Yoncalık-1 trench is located at the eastern end of Yoncalık basin. The trench is excavated perpendicular to the N70W trending segment nearby an offset gully. Both walls of the trench expose a good stratification and clear structural relations indicating three paleoevents. The Yoncalık-2 trench is located at 1 km west of Yoncalık-1 site. A linear depression and elongate ridge characterize the N70E trending fault segment on trench site. One (possibly two) paleoevent(s) are exposed in the trench according to stratigraphic and structural interpretations. Thickens of sediment above the last event horizon in both trenches indicate Kargapazarı segment have not ruptured in the last century. Dating process of collected charcoal and OSL samples are still underway. First observations and interpretations show that Kargapazarı segment was most probably broken neither in 1949 nor in 1966 earthquakes that occurred its western an eastern continuation respectively. Considering that the North Anatolian Fault has almost totally broken with large earthquakes during 20th century, Kargapazarı segment may be remained unbroken and constitutes a seismic gap.